

IN THE CLAIMS

Please amend the claims to read as follows:

1. (Currently Amended) A voltage-controlled tunable multilayer filter comprising:
a first resonator on a first layer of ~~dielectric material or~~ low-temperature-co fired-ceramic (LTCC);
a second resonator coupled to said first resonator on a second layer of ~~dielectric material or~~ low-temperature-co fired-ceramic (LTCC);
a third resonator coupled to said second resonator and cross coupled to said first resonator;
an input transmission line connected to said first resonator;
an output transmission line connected with said third resonator; and
a voltage tunable variable capacitor in at least one of said resonators.
2. (Original) The voltage-controlled tunable multilayer filter of claim 1, further comprising a dc blocking capacitor in at least one of said resonators.
3. (Original) The voltage-controlled tunable multilayer filter of claim 2, further comprising DC biasing circuit associated with said filter.
4. (Previously Amended) The voltage-controlled tunable multilayer filter of claim 3, wherein said DC biasing circuit includes at least one resistor to prevent leakage into said DC biasing circuit.
5. (Previously Amended) The voltage-controlled tunable multilayer filter of claim 1, wherein there are a total of nine layers of LTCC or dielectric material.

6. (Previously Amended) The voltage-controlled tunable multilayer filter of claim 5, wherein at least two of said nine layerers are used as an inner ground plane to implement a stripline structure.

7. (Previously Amended) The voltage-controlled tunable multilayer filter of claim 6, wherein the second layer and the sixth layer are used as the inner ground plane to implement the stripline structure.

8. Cancel claim 8.

9. (Previously Amended) The voltage-controlled tunable multilayer filter of claim 4, wherein said at least one resistor in the biasing circuit is implemented in the first layer with resistive paste.

10. (Previously Amended) The voltage-controlled tunable multilayer filter of claim 7, wherein input output lines are taken to the bottom plane through apertures in the second layer.

11. (Original) The tunable filter of claim 1, wherein said variable capacitor comprises:

- a substrate having a low dielectric constant with planar surfaces;
- a tunable dielectric film on said substrate comprising a low loss tunable dielectric material;
- a metal electrode with predetermined length, width, and gap distance; and
- a low loss isolation material used to isolate an outer bias metallic contact and a metallic electrode on the tunable dielectric.

12. (Previously Amended) The voltage-controlled tunable multilayer filter of claim 1, wherein a center frequency of the filter is tuned by changing the variable capacitor capacitance by changing a voltage.

13. (Currently Amended) A method of using voltage to tune a multilayer filter, comprising the steps of:

providing a first resonator on a first layer of ~~dielectric material~~ or low-temperature-co fired-ceramic (LTCC);

providing a second resonator coupled to said first resonator on a second layer of ~~dielectric material~~ or low-temperature-co fired-ceramic;

providing a third resonator coupled to said second resonator and cross coupled to said first resonator;

inputting a transmission line connected to said first resonator;

outputting a transmission line connected with said third resonator; and

varying the capacitance in at least one of said resonators by using a voltage tunable capacitor.

14. (Original) The method of using voltage to tune a multilayer filter of claim 13, further comprising the steps of including a dc blocking capacitor in at least one of said resonators.

15. (Original) The method of using voltage to tune a multilayer filter of claim 14, further comprising biasing said filter with a DC biasing circuit.

16. (Previously Amended) The method of using voltage to tune a multilayer filter of claim 15, wherein said DC biasing circuit include at least one resistor to prevent leakage

into said DC biasing circuit.

17. (Currently Amended) The method of using voltage to tune a multilayer filter of claim 13, wherein there are a total of nine layers of LTCC tape ~~or dielectric material~~.

18. (Previously Amended) The method of using voltage to tune a multilayer filter of claim 17, wherein at least two of said nine layers are used as an inner ground plane to implement a stripline structure.

19. (Previously Amended) The method of using voltage to tune a multilayer filter of claim 18, wherein the second layer and the sixth layer are used as the inner ground plane to implement the stripline structure.

20. Cancel claim 20.

21. (Previously Amended) The method of using voltage to tune a multilayer filter of claim 16, wherein said at least one resistor in the biasing circuit is implemented in the first layer with resistive paste.

22. (Previously Amended) The method of using voltage to tune a multilayer filter of claim 19, wherein input output lines are taken to the bottom plane through apertures in the second layer.

23. (Original) The method of using voltage to tune a multilayer filter of claim 13, wherein said variable capacitor comprises:

a substrate having a low dielectric constant with planar surfaces;

a tunable dielectric film on said substrate comprising a low loss tunable dielectric

material;

a metal electrode with predetermined length, width, and gap distance; and

a low loss isolation material used to isolate an outer bias metallic contact and a metallic electrode on the tunable dielectric.

24. (Previously Amended) The method of using voltage to tune a multilayer filter of claim 13, wherein a center frequency of the filter is tuned by changing the variable capacitor capacitance by changing a voltage.

25. (Currently Amended) A voltage-controlled tunable multilayer filter comprising:
a first resonator on a first layer of ~~dielectric material~~ or low-temperature-co fired-ceramic (LTCC);

a second resonator coupled to said first resonator on a second layer of ~~dielectric material~~ or low-temperature-co fired-ceramic;

a third resonator coupled to said second resonator and cross coupled to said first resonator;

an input transmission line connected to said first resonator;

an output transmission line connected with said third resonator; and

a MEMS based varactor in at least one of said resonators.

26. (Original) The voltage-controlled tunable multilayer filter of claim 25, wherein said MEMS varactor uses a parallel plate topology.

27. (Original) The voltage-controlled tunable multilayer filter of claim 25, wherein said MEMS varactor uses an interdigital topology.